CASE REPORT

Traumatic bifocal avulsion of the patellar tendon

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Introduction

Traumatic unilateral rupture of the quadriceps mechanism is common. Injury in the region of infrapatellar tendon accounts for about one third of these cases according to a study from Mayo clinic.\textsuperscript{1} However, injuries in the infrapatellar region occur at a single level and bifocal avulsion of the patellar tendon has not been reported so far in English literature. We report the first case of simultaneous avulsions of the patellar and tibial insertions of the quadriceps mechanism.

Case report

An 83-year-old, otherwise healthy male patient presented to us with severe pain in the right knee region and inability to walk. According to the patient, his right foot was stuck in a ditch outside his home causing him to fall on his right knee. There was localized swelling and a palpable tender defect at the inferior edge of patella with high riding patella. Despite active quadriceps contraction, he was unable to perform straight leg raising. He denied any previous knee problems, concurrent medical illness or injections to the knees. He was not on any medications. Routine hematological and biochemical investigations were within normal limits. Serological investigations were negative for rheumatoid factor, antinuclear factor, mitochondrial antibody, smooth muscle antibody and DNA antibody. Radiographically (Fig. 1), the knee joint showed patella alta with a transverse fracture of the lower third of the patella and a fracture of the anterior tibial tuberosity, indicating rupture of the patellar tendon. There were minimal signs of osteoarthritis.

A diagnosis of bifocal avulsion of patellar tendon was made and patient was surgically treated. The operation was performed under tourniquet through midline longitudinal incision. The patellar tendon was found to be ruptured from the lower pole of patella with a comminuted fracture of the lower pole. The tibial tuberosity was avulsed from the proximal tibia with cephalad migration. The comminuted distal pole of patella was excised and patellar tendon was repaired and reattached to the patella through two drill holes with #5 Ethibond suture. The tibial tuberosity was reattached with a 4 mm cancellous screw and cerclage wiring (Fig. 2). A cylindrical cast from groin to ankle was applied for 6 weeks. After 6 weeks, patient was able to extend the knee actively. He was put on physiotherapy including continuous passive motion. After 3 months his range of motion was 0—90\textdegree{} and he was able to walk without limp.

Discussion

Rupture of the patellar tendon is a frequent, yet disabling traumatic knee injury. The true incidence

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is unknown but it is less common than quadriceps tendon rupture. It is the third commonest injury to extensor mechanism of knee, following patellar fracture and quadriceps tendon rupture. The injury most commonly occurs in patients younger than 40 years of age who overload the extensor mechanism during the athletic activity.\(^1\),\(^3\) It is estimated that a force of 17.5 times body weight is required to cause rupture of the patellar tendon in healthy patients.\(^7\) Rupture usually occurs when a massive contraction of the quadriceps muscle is resisted with a flexed knee. According to McMaster\(^4\) and Conway\(^2\), normal muscles and tendons do not rupture in their substance even when submitted to severe strain. Without previous weakening, a significant indirect force applied to a tendon produces either a fracture of the adjacent bone or a tear of the tendon insertion or of the adjacent muscle. Traumatic rupture of an otherwise healthy patellar tendon usually is unilateral. However, bilateral rupture occurs in patients with tendon degeneration. Many factors could cause weakness of the tendon or muscle rendering them susceptible to spontaneous rupture. Poor blood supply as found in arteriosclerosis, diabetes mellitus, polyarteritis nodosa, lupus erythematosus, rheumatoid arthritis, systemic and local steroids, hyperparathyroidism, gout, alkaptonuria, fluorquinolone treatment and chronic renal failure are all predisposing factors for the spontaneous rupture of the muscle or tendon.\(^5\) In the case presented, however, there was no known predisposing factor. Age related degeneration could be a predisposing factor in this 83-year-old man but the failure of the extensor mechanism in this case did not occur through the muscle or tendon but through osseous regions both proximally and distally.

A single mechanism fails to explain the occurrence of the bifocal avulsion of the patellar tendon. Failure of the extensor apparatus at one site will preclude failure at another site due to the proximal retraction of the quadriceps and lack of pull on the distal part of the extensor mechanism. The mechanism of this patient’s bifocal infrapatellar tendon rupture is possibly indirect trauma to the tibial tuberosity caused by eccentric violent contraction of quadriceps tendon while the foot was struck in the ditch followed by direct trauma to the lower end of patella due to fall resulting in its comminuted fracture. We believe that the order in which these injuries occurred is important as the reversal of mechanism leading to the occurrence of the fracture of the lower pole of the patella first could not have lead to the avulsion of the patellar tendon subsequently as the indirect trauma would not have exerted any force on the patellar tendon insertion due to a breech in the extensor mechanism proximally. No local or systemic underlying cause explained why this patient had bipolar rupture of his patellar tendon, which seemed to result from forces within physiological levels for this man. A satisfactory result was obtained by operative fixation of tibial tuberosity and repair and reattachment of patellar tendon after excision of distal pole of patella.

In summary, a case of traumatic, bipolar avulsion of the infrapatellar tendon in an 83-year-old man is reported. Such injury has been reported after ACL reconstruction;\(^6\) however, this injury is very rare in absence of ACL reconstruction and seems not to have been previously documented. The possible mechanism of the injury has been discussed. The treatment consists of surgical repair and cast immobilization. The functional result was satisfactory.
Acknowledgement

The authors thank Dr. Bhavuk Garg, resident in orthopedic surgery for his contribution to the preparation of this manuscript.

References